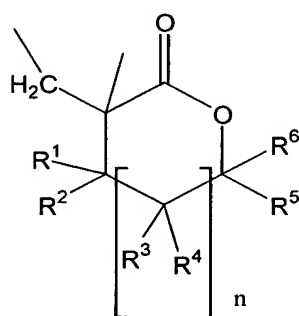
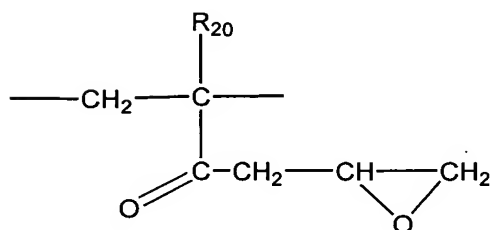


# CLAIMS

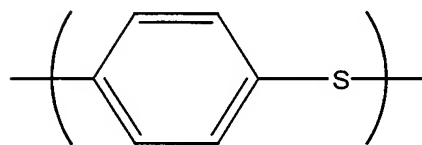
1. A copolymer composition comprising:
  - (a) at least one polymeric repeat unit represented by formula I derived from alpha-methylene lactone monomer,
  - (b) at least one polymeric repeat unit represented by formula II derived from glycidyl methacrylate monomer, wherein said polymeric repeat unit represented by formula II comprises from about 0.5% to about 45% by weight of the copolymer composition;
  - (c) polyphenylene sulfide according to formula (III), and
  - (d) optionally, one or more impact modifier in the range from 0.5% to 35% by total weight of all compounds,



(I)



(II)



(III)

wherein: n is 0, 1 or 2;

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, and R<sub>20</sub> are independently hydrogen, a functional group, hydrocarbyl or substituted hydrocarbyl,

2. The composition as recited in Claim 1 wherein when  $n = 0$ ;  $R^1$ ,  $R^2$ , and  $R^5$  are independently hydrogen, and  $R^6$  is methyl.

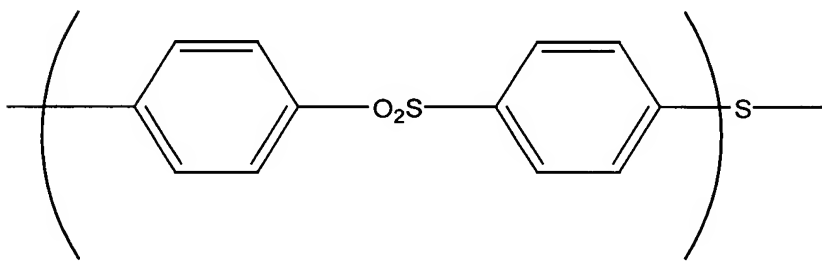
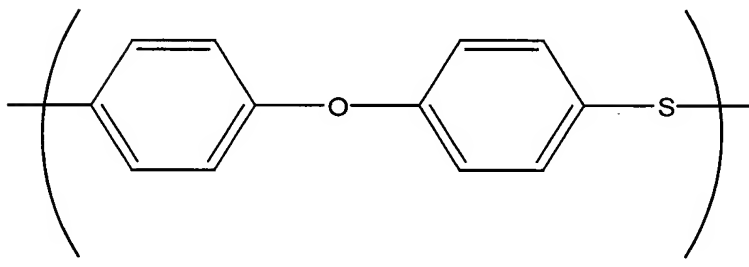
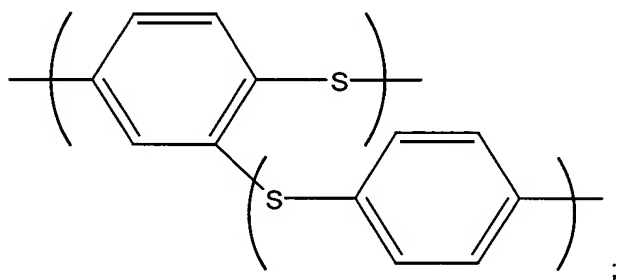
3. The composition as recited in Claim 1 or Claim 2 wherein the glycidyl methacrylate content is from about 0.5% to about 35% of the total composition.

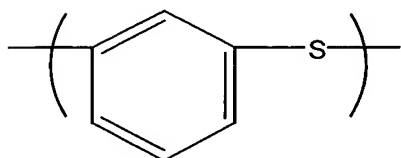
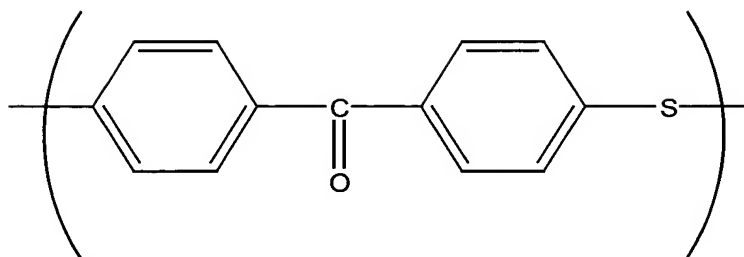
4. The composition as recited in Claim 1, wherein the impact modifier is selected from at least one random copolymer, the random copolymer being selected from the group consisting of branched and straight chain polymers, the polymers being derived from the group consisting of:

- (a) ethylene;
- (b) CO;
- (c) unsaturated monomers selected from the class consisting of alpha, beta -ethylenically unsaturated carboxylic acids having from 3 to 8 carbon atoms, and derivatives thereof selected from the class consisting of monoesters of alcohols of 1 to 29 carbon atoms and the dicarboxylic acids and anhydrides of the dicarboxylic acids and the metal salts of the monocarboxylic, dicarboxylic acids and the monoester of the dicarboxylic acid having from 0 to 100 percent of the carboxylic acid groups ionized by neutralization with metal ions;
- (d) unsaturated epoxides of 4 to 11 carbon atoms;
- (e) residues derived by the loss of nitrogen from an aromatic sulfonyl azide substituted by carboxylic acids taken from the class consisting of monocarboxylic and dicarboxylic acids having from 7 to 12 carbon atoms and derivatives thereof taken from the class consisting of monoesters of alcohols of 1 to 29 carbon atoms and the dicarboxylic acids and anhydrides of the dicarboxylic acids and the metal salts of the monocarboxylic, dicarboxylic acids and the monoester of the dicarboxylic acid having from 0 to 100 percent of the carboxylic acid groups ionized by neutralization with metal ions;
- (f) unsaturated monomers selected from the class consisting of acrylate esters having from 4 to 22 carbon atoms, vinyl esters of acids having from 1 to 20 carbon atoms, vinyl

- ethers of 3 to 20 carbon atoms, vinyl and vinylidene halides, and nitriles having from 3 to 6 carbon atoms; and
- (g) unsaturated monomers having at least one substituent selected from the group consisting of pendant hydrocarbon chains of 1 to 12 carbon atoms and pendant aromatic groups optionally having 1 to 6 substituent groups having a total of 14 carbon atoms.

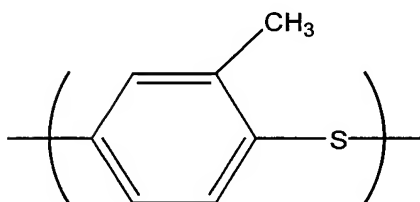
5. A composition according to Claim 1 wherein the polyphenylene sulfide according to formula (III) is selected from the group consisting of :





and;

5



6. A method for preparing a copolymer composition, the method comprising the steps of:
- (a) contacting at least one alpha methylene lactone monomer of formula (I) with a glycidyl methacrylate monomer of general formula (II), in an aqueous medium,
  - (b) optionally, contacting the product of step (a) with a chain-transfer agent and a surfactant,
  - (c) contacting the product of step (a) or step (b) with an initiator,
  - (d) contacting the product of step (c) with a coagulant, to obtain the copolymer composition,
  - (e) optionally, contacting the product of step (d) with ethyl acetate,
  - (f) optionally, agitating the product of step (e),
  - (g) optionally, filtering the copolymer composition, and
  - (e) optionally, drying the copolymer composition.
7. The method of Claim 6 wherein the alpha methylene lactone monomer is 5-methyl-alpha-methylene-gamma-butyrolactone.

8. The method of Claim 7 wherein the chain transfer agent is 2-ethylhexylthioglycolate, the surfactant is dioctylsulfosuccinate, the initiator is potassium persulfate, and the coagulant is  $\text{MgSO}_4$ .

9. The method of Claim 6 wherein the chain transfer agent is  
5 selected from mercaptans, polymercaptans, and polyhalogen compounds.

10. The method of Claim 6 wherein the surfactant is selected from alkali metal and ammonium salts of alkyl, aryl, alkaryl, and ara-alkyl sulfonates, sulfates, and polyether sulfates, ethoxylated fatty acids, esters, alcohols, amines, amides, alkyl phenols, complex organo-phosphoric  
10 acids, and their alkali metal and ammonium salts

11. The method of Claim 6 wherein the initiator is selected from the group consisting of thermal initiators, azo-type initiators, persulfates, peroxy-sulfates, and redox-type initiators, wherein the thermal initiators are selected from the group consisting of organo peroxides, acetyl peroxides, lauroyl peroxide, t-butyl peroxide, di-t-butyl hydroperoxide, and peresters;  
15 and the redox-type initiators are selected from the group consisting of hydroperoxide being selected from the group consisting of hydrogen peroxide, t-butyl hydroperoxide, cumene hydroperoxide, and diisopropylbenzene hydroperoxide, and a reducing agent being selected from the  
20 group consisting of sodium, potassium, or ammonium bisulfite, metabisulfite, hydrosulfite, sulfur dioxide, hydrazine, ferrous salts, isoascorbic acid, and sodium formaldehyde sulfoxalate.

12. The method of Claim 6 wherein the coagulant is selected from magnesium sulfate, sodium chloride, calcium chloride.

25 13. A shaped, molded or extruded article comprising the copolymer composition of Claim 1.